

What is claimed is:

1           1.   A magnetic field sensor characterized in  
2   comprising:

3           a magnetic field element for outputting a signal in  
4   accordance with an applied magnetic field strength to an  
5   output terminal;

6           a switch circuit for inputting the signal of said  
7   output terminal of said magnetic field element and for  
8   outputting a signal selected by a signal comprising first  
9   and second phases given from the outside of said switch  
10   circuit, wherein

11                said switch circuit comprises first and second  
12   memory elements,

13                in said first phase of said signal given from the  
14   outside of said switch circuit, the output voltage of the  
15   output terminal of said magnetic field element is stored in  
16   said first memory element and the voltage stored in said  
17   second memory element is given to said amplifier and,

18                in said second phase, the voltage stored in said  
19   first memory element is given to said amplifier and the  
20   voltage of the output terminal of said magnetic field  
21   element is stored in said second memory element;

22                said amplifier wherein at least one input terminal is  
23   connected to the output terminal of said switch circuit and  
24   a voltage gained by amplifying the signal of this input

25 terminal is outputted to an output terminal;  
26 a third memory element of which one end is connected  
27 to said output terminal of said amplifier;  
28 a signal output terminal connected to said other  
29 terminal of said third memory element; and  
30 a switch of which one end is connected to the other  
31 end of said third memory element and which carries out  
32 opening and closing operations by means of said signal  
33 which comprises the first and the second phases given from  
34 the outside of said switch, wherein said switch closes in  
35 said first phase so that said third memory element stores  
36 an output voltage of said amplifier and said switch opens  
37 in said second phase so that a sum of said voltage stored  
38 in said third memory element and an output voltage of said  
39 amplifier is outputted to said signal output terminal.

1 2. A magnetic field sensor according to Claim 1,  
2 characterized in that at least one memory element among  
3 said memory elements is a capacitor.

1 3. A magnetic field sensor according to Claim 1,  
2 characterized in that:

3 said switch comprises first, second and third parallel  
4 connections wherein first and second conductive  
5 characteristics transistors are connected in parallel, and

6 the connection between two terminals of said first and  
7 second conductive characteristics transistors are conducted  
8 or cut off by a binary signal given from the outside of  
9 said switch,

10 wherein both ends of the second parallel connection  
11 are connected to one end of the first parallel connection;  
12 and both ends of the third parallel connection are  
13 connected to the other end of the first parallel  
14 connection; and the first conductive characteristics  
15 transistor in the first parallel connection is driven by a  
16 different value of the binary signal from a value of the  
17 binary signal for driving the first conductive transistors  
18 in the second and third parallel connections; and the  
19 second conductive characteristics transistor in the first  
20 parallel connection is driven by a different value of the  
21 binary signal from a value of the binary signal for driving  
22 the second conductive transistors in the second and third  
23 parallel connections.

1 4. A magnetic field sensor according to Claim 1,  
2 characterized in that said magnetic field element is a  
3 Hall element.

1 5. A magnetic field sensor according to Claim 4,  
2 characterized in that at least one of the resistances for

3 defining the gain of the amplifier is an element of which  
4 the manufacturing process is identical to that of the Hall  
5 element.

1 6. A magnetic field sensor according to Claim 1  
2 characterized in that:

3 a magnetic field sensor further comprises the other  
4 signal output terminal, wherein the sum of said voltage  
5 stored in said third memory element and an output voltage  
6 of said amplifier is outputted from said signal output  
7 terminal and the other signal output terminal;

8 said magnetic field element outputs the signal from a  
9 first terminal pair in said first phase of the signal and  
10 the signal from a second terminal pair in said second phase  
11 of the signal in accordance with the applied magnetic field  
12 strength, wherein polarities of the signal in said first  
13 phase of the signal and said second phase of the signal are  
14 mutually opposite;

15 said first and second memory elements are first and  
16 second condensers, respectively; and

17 said switch circuit further comprises:

18 a first connection part which connects terminals  
19 of said first terminal pair and both ends of said first  
20 condenser, respectively;

21 a second connection part which connects terminals

22 of said second terminal pair and both ends of said second  
23 condenser, respectively;

24 a first switch part which is inserted and makes  
25 a connection in said first connection part and which closes  
26 this first connection part in said first phase of the  
27 signal and opens this first connection part in said second  
28 phase of the signal;

29 a second switch part which is inserted and makes  
30 a connection in said second connection part and which opens  
31 this second connection part in said first phase of the  
32 signal and closes this second connection part in said  
33 second phase of the signal;

34 a third connection part which connects both ends  
35 of said first condenser to the input terminal of said  
36 amplifier as well as to the other signal output terminal,  
37 respectively;

38 a fourth connection part which connects both ends  
39 of said second condenser to the input terminal of said  
40 amplifier as well as to the other signal output terminal,  
41 respectively;

42 a third switch part which is inserted and makes  
43 a connection in said third connection part and which opens  
44 this third connection part in said first phase of the  
45 signal and closes this third connection part in said second  
46 phase of the signal; and

47           a fourth switch part which is inserted and makes  
48   a connection in said fourth connection part and which  
49   closes this fourth connection part in said first phase of  
50   the signal and opens this fourth connection part in said  
51   second phase of the signal.

1           7.   A method for detecting magnetic field comprising  
2   the steps of:

3           (a)   outputting a signal according to an applied  
4   magnetic field strength through a magnetic field element in  
5   a first signal period;

6           (b)   storing said signal in a first memory element and  
7   inputting voltage stored in a second memory element to an  
8   amplifier in the first signal period;

9           (c)   outputting the signal according to the applied  
10   magnetic field strength through said magnetic field element  
11   in a second signal period, wherein polarities of the  
12   signals according to said applied magnetic field strength  
13   in the first signal period and the second signal period are  
14   mutually opposite;

15          (d)   inputting voltage stored in said first memory  
16   element to said amplifier and storing the signal according  
17   to an applied magnetic field strength in the second memory  
18   element in the second signal period;

19          (e)   amplifying voltage inputted in the first signal

20 period for outputting a voltage signal across a pair of  
21 output terminals of said amplifier and inputting a signal  
22 of the pair of output terminals of said amplifier to both  
23 ends of a condenser; and

24 (f) amplifying voltage inputted in the second signal  
25 period for outputting a voltage signal across a pair of  
26 output terminals of said amplifier and inputting a signal  
27 of one output terminal in the pair to one end of said  
28 condenser, and outputting a signal across the other end of  
29 said condenser and the other output terminal of said  
30 amplifier to a second pair of output terminals,  
31 respectively.

1 8. A method for detecting magnetic field according  
2 to Claim 7, characterized in that the magnetic field  
3 element outputs said first signal and said second signal in  
4 accordance with a Hall effect.

1 9. A method for detecting magnetic field according  
2 to Claim 7, characterized by further comprising a step of:  
3 (g) halting a power source supply to the magnetic  
4 field element in every constant period.